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FOOTBED PLUG

TECHNICAL FIELD

This invention relates to footwear and outsole assemblies used in the construction of footwear.

BACKGROUND

For either low or high impact walking activities, the heel area is the first area of the foot to come in contact with hard and abrasive surfaces such as cement. Generally, in an effort to correctly distribute pressure on the heel and to provide comfort, absorb shock, and relieve foot pain, a number of different heel support systems can be used.

SUMMARY

In a general aspect of the invention, an outsole assembly includes an outsole having an inner surface including an opening and a footbed placed over the inner surface of the outsole. The footbed provides an outer surface with a plug configured to be inserted into the opening.

In embodiments of the invention, one or more of the following features may also be included. The footbed is formed of a material having a first hardness characteristic that is less than a second hardness characteristic of an outsole material. For example, the plug is formed of a material having a first hardness characteristic that is less than a second hardness characteristic of an outsole material. In certain embodiments, the footbed and the plug are formed of a material having substantially the same hardness characteristics. For example, the outsole is formed of a material having an A-scale durometer hardness between 60A and 100A, and the footbed and the plug are formed of a material having an A-scale durometer hardness between 30A and 60A.

The plug includes a pedestal section and a cap section with the pedestal section being connected to an outer surface of the footbed. Additionally, the cap section includes an outer peripheral edge having an outer peripheral dimension and an inner peripheral edge having an inner peripheral dimension where the inner peripheral edge is connected to the pedestal section having a pedestal peripheral dimension.

As yet another feature, the outer peripheral dimension is substantially the same as the inner peripheral dimension. Also, the inner peripheral dimension is larger than the pedestal peripheral dimension.

Furthermore, the inner peripheral edge forms a projecting lip when the inner peripheral edge is connected to the pedestal section. The opening of the outsole has an opening peripheral dimension that is less than inner peripheral dimension as well as a corresponding matching dimension for mating with the pedestal peripheral dimension.

In certain embodiments, the pedestal peripheral dimension mates with the opening peripheral dimension, forming a relatively watertight fit between the outsole and the footbed.

As yet another feature, the outsole has a walking surface including an indented surface corresponding to the inserted plug. The indented surface forms a non-contact surface with a walking ground.

In another aspect, a method includes providing an outsole having an inner surface including an opening and positioning a footbed over the inner surface of the outsole where the footbed has an outer surface that includes a plug configured to be inserted into the opening.

As another feature, the method also includes forming the footbed using a material having a first hardness characteristic that is less than an outsole material having a second hardness characteristic. Additionally, the method includes forming the plug using a material having a first hardness characteristic that is less than an outsole material having a second hardness characteristic.

In general, the outsole system provides comfort, support, and shock absorption in the heel and arch areas. The outsole system distributes pressure and helps position the foot correctly to relieve pain, especially in the heel area. In particular, it reduces pain and stress caused by a variety of foot ailments such as heel spurs, prolonged walking, Achilles tendonitis, and the like.

Among other advantages, the outsole system provides stabilization and cushioning to position the foot correctly within any type of footwear. It anatomically corrects the arch of the foot and helps position the foot so the heel sits correctly to cushion the heel bone, relieving acute and chronic symptoms related to heel pain. In other words, the outsole system cups the heel and helps control rocking motion of the foot. The outsole system can

advantageously prevent further injuries and deterioration of the heel area from high impact or prolonged activities.

The outsole system can be easily incorporated with uppers and/or vamps having a wide variety of casual, dress, or athletic shoe styles to provide the necessary support in the heel area most susceptible to pain and stress.

Another benefit of the outsole system is the durability of the system for outdoors and street-wear usage. The outsole system can be used for many years on abrasive surfaces such as cement, asphalt, or any type of industrial surface.

The outsole system features a durable and comfortable design. The sole provides excellent support characteristics, providing resistance and long-term health benefits to the wearer. In addition, the outsole is lightweight, supple, and easy to care for. Further, the outsole system features secure attachment of the outsole components allowing the outsole to withstand constant abrasive abuse without fear of tears, rips, leaks, and the like.

The details of one or more embodiments of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

FIG. 1 is an exploded perspective view of an outsole assembly.

FIG. 2 is a perspective top view of an outsole of the outsole assembly of FIG. 1.

FIG. 3 is a perspective view of a portion of a footbed of the outsole assembly of FIG. 1.

FIG. 4 is a perspective bottom view of the outsole of the outsole assembly of FIG. 1.

FIG. 5 is an exploded perspective view of another outsole assembly.

FIG. 6 is an exploded perspective view of an outsole and a footbed of the outsole assembly of FIG. 5.

DETAILED DESCRIPTION

Referring now to the figures in which identical elements are numbered identically throughout, a description of the embodiments of the present invention will now be provided.

Referring to FIGS. 1 and 2, an outsole assembly 10 includes an outsole 12 and a footbed 14 which has a plug 16 located in a central position of a heel region 17. The outsole

assembly 10 is constructed by joining the outsole 12 to the footbed 14 as will be described more fully below.

The outsole 12 has a walking surface 18, a heel region 22, and an opposite toe region 24. The outsole 12 includes, along its periphery, an upstanding wall 26 that surrounds a cavity 30 in an inner surface 19 for receiving the footbed 14. The outsole 12 also includes an opening 20 positioned in the heel region 22. The opening 20 extends from the cavity 30 to the walking surface 18 of the outsole 12 and has an opening perimeter.

The footbed 14 has an under surface 28 that is positioned within the cavity 30, with the plug 16 placed over and inserted into the opening 20 to ensure a tight fit between the plug 16 and the opening 20. Specifically, the opening 20 has a perimeter commensurate with the opening perimeter for tightly mating with the plug 16.

The outsole 12 and the footbed 14 are made of materials, e.g., rubber such as molded polyurethane, each having different hardness characteristics. The hardness characteristic of the footbed 14 and the plug 16 are in the measured range between 30A and 60A (Durometer "A" scale or "Type A") whereas the outsole 12 has a hardness characteristic that is greater then the hardness of the footbed 14 and the plug 16, e.g., in a measured range between 60A to 100A. The footbed 14 and the plug 16 are formed of the same material such as polyurethane having substantially similar hardness characteristics. The plug 16 is integrally molded into the footbed 14 and forms a monolithic unit with the footbed 14.

The footbed 14 may include an inner liner (not shown) covering a footbed upper surface 15 for absorbing moisture and providing more cushioning when the outsole assembly 10 is worn. The inner lining of the footbed 14 may be made of a thinner, absorbent and breathable type of leather or any type of suitable material.

Referring in particular to FIG. 2, the outsole 12 also includes a vertical heel wall 46 in the heel region 22. The vertical heel wall 46 has a height that is commensurate with a height of the footbed 14 for accommodating the footbed within the cavity 30. Once the footbed 14 is placed within the cavity 30, a vamp (not shown) is provided to cover the upper part of the wearer's foot and toes to form a spacing where a wearer's foot can be inserted. A vamp may be either of an open or closed toe design in the toe region 24.

Referring to FIG. 3, the plug 16 includes a cap structure 48 integrally attached to a pedestal structure 49, together having a shape similar to the cork of a champagne bottle. The

cap structure 48 includes an outer edge 33 and an inner edge 35 having an equal perimeter length, whereas the pedestal structure 49 has a smaller perimeter than the perimeters of the inner and outer edges. The pedestal structure 49 is connected to the cap structure 48, forming a projecting lip 50 around the entire periphery of the cap structure 48. The projecting lip 50 provides the resistance needed to maintain the cap structure 48 pressed against the walking surface 18 while the pedestal structure 49 securely bridges the cap structure 48 to the footbed 14 (FIG. 1).

Although the cap structure 48 is sufficiently malleable to pass through the perimeter of the opening 20, the perimeter length of the outer edge 33 and the inner edge 35 are larger than the perimeter of the opening 20. Accordingly, after the cap structure 48 has been inserted through the opening 20, the perimeter of the pedestal structure 49 fits tightly and seals the contact between the opening 20 and the cap structure 48 so that the walking surface 18 is completely watertight in the heel region 22, making the walking surface and the now closed opening 20 non-porous to water, dirty, and the like. In other words, the perimeter of the opening is complimentary in length to the perimeter of the pedestal structure 49. Moreover, a width of the outsole 14 in the opening 20 is commensurate with a width of the pedestal structure 49 to provide for the watertight seal in the walking surface 18 of this example. Therefore, the cap structure 48 is like the head of the champagne bottle which is inserted through a hole with the protruding edges of the head providing the structure to hold the head in position just as the projecting lip 50 holds the plug 16 securely in place.

Referring to FIG. 4, once inserted, the plug 16 is positioned in an indented surface 13 that is not in contact with any walking ground or cement. The indented surface 13 is positioned below the walking surface 18 of the outsole 12 by about 1.5 mm as illustrated by an impressed region 11. This prevents any wear and tear of the cap section 48.

Referring to FIGS. 5 and 6, a shoe 100 having an outsole assembly 10b with an outsole 12b for receiving a footbed 14b that includes a plug 16b is illustrated. FIG. 6 illustrates an area defining a volume 102 for placement of a wearer's foot. The outsole assembly 10b includes the outsole 12b that has an opening 20b integral to a cavity 52 including a cavity base 54. The outsole assembly 10b also includes an insole 21 with an aperture 25 corresponding in peripheral dimension to the cavity 52 of the outsole 12b. The insole 21 is fibrous and securely attached to an inner surface 19b of the outsole 12b by an

adhesive material. The insole 21 also includes a fiber tuck 27. The cavity base 54 prevents the opening 20b from extending from the inner surface 19b all the way to a walking surface 18b. The footbed 14b includes a plug 16b in a heel region 17b, where the plug 16b is configured to be positioned within the cavity 52 and be attached against the cavity base 54 for a secure attachment of the footbed 14b to the outsole 12b. In a footbed upper surface 15b, the footbed 14b includes a porous sockliner 56 for providing further cushioning.

The construction method of the various examples of outsole assemblies described above will now be described in conjunction with the accompanying figures.

In preparation for constructing the outsole assembly 10 illustrated in FIG. 1, the vamp (not shown) is cemented to an upstanding wall 60 of the outsole 12 and then hand-sewn to the outsole assembly 10. The footbed 14 is prepared by providing in the footbed upper surface 15 a hydrophilic foam (not shown) and a leather cover (not shown). The footbed 14 is then inserted within the attachment cavity 30. A last (not shown) is forced into the cavity 30 and pressed, thus forcing the plug 16 of the footbed 14 into the opening 20 in the heel region 22 of the outsole 12. The footbed upper surface 15 of the footbed 14 is anatomically shaped and requires that the last provide a bottom showing the negative of the footbed 14. The bottom of the last (not shown) has a partially concave bottom to allow for a convex protuberance of the footbed 14 at the walking surface 18b.

Referring back to FIGS. 6 and 7, for this embodiment, the vamp or upper 103 is cement lasted over the insole 21 and finished with the corresponding outsole 12b, ready to accept the footbed 14b with the plug 16b in the heel region 17b. The footwear 100 is conventionally finished, except that the outsole 12b includes the cavity 52 that receives the plug 16b of the footbed 14b. The footbed 14b may be prepared with a hydrophilic foam or other foam cover and leather.

Although the outsole assembly 10 is shown having a heel height 45 having a height 43, the outsole assembly 10 may be made to accommodate and fit heels of various sizes, such as heel 44 having predetermined height of 42. Moreover, the method of construction herein described relates to general methods of footwear and outsole manufacturing that are entirely within the scope of the invention. Furthermore, a number of embodiments of the invention have been described. Nevertheless, it will be understood that various modifications may be

made without departing from the spirit and scope of the invention. Accordingly, other embodiments are within the scope of the following claims.